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09/976,240	10/12/2001	Sae-Young Chung	12144-009001	9712

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EXAMINER	
BHATTACHARYA, SAM	

ART UNIT	PAPER NUMBER
2687	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/976,240	CHUNG ET AL.	
	Examiner	Art Unit	
	Sam Bhattacharya	2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *20-35 and 38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-19,36 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-14, 16-19, 36 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Leung et al. (U.S. Patent 6,262,980).

As to claim 1, Figures 2 and 3 in Leung show a method comprising:

in a cell having a first sector and at least one other sector of a cellular wireless communication system, determining a current state of transmissions in at least one of the other sectors of the cell or a sector in another cell (the current state of transmission in the sectors of the cell is determined because a reuse pattern for the cell is specified (See FIG. 3)); and altering the SIR of at least one user in the first sector of the cell by temporarily reducing transmissions on a forward link in at least one other sector of the cell or a sector in another cell in accordance with a pattern based on the determined current state of transmissions ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). "Time is slotted such that a packet can be transmitted in each slot, and the downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the same radio spectrum"

(Col. 6, lines 64-67). "Time slots need to be dynamically allocated to various transmitters to send data packets such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 2, the Leung reference discloses the method of claim 1 in which the pattern is organized in a sequence of time slots and the pattern defines which of the sectors has transmissions turned on or off in each of the time slots ("it is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA

method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 5, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a status of transmissions scheduled in neighboring sectors in the cell or in one or more other cells (see Col. 7, lines 22-42).

As to claim 6, the Leung reference discloses the method of claim 5 in which the current state of transmissions includes transmission rates of some neighbor sectors ("traffic load" in Col. 11, line 32 to Col. 12, line 16).

As to claim 7, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a next time slot usage for one or more sectors ("in the ESRA method, the procedure shown in FIG. 6 is invoked for each time frame by each sector in every cell to assign available time slots in the frame to pending packets for transmission. Once a packet is scheduled for transmission in a time slot, the slot becomes unavailable to other packets" (Col. 10, line 65 to Col. 11, line 3)).

As to claim 8, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a forward link SIR of users in one or more sectors (see Figure 4 and Col. 9, lines 31-58).

As to claim 9, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes user location ("depending on terrain and fading, a certain terminal (e.g., house) may be constantly unable to receive a signal with a satisfactory SIR due to its fixed location. The transmission for other terminals may always be successful. Thus, terminals at "good" and "poor" locations should be served according to different time-slot reuse patterns, which is called Time Slot Reuse Partitioning (TSRP)" (Col. 7, lines 22-28)).

As to claim 10, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a fairness setting for one or more users ("without loss of generality, consider that terminals of all classes have an identical traffic load" (Col. 11, lines 38-39). "Using ESRA terminal classification and scheduling, packet transmission for all terminal classes can be successfully received given a specific SIR threshold" (Col. 15, lines 52-54). See also Col. 11, line 32 to Col. 12, line 16).

As to claim 11, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes an application type of one or more user or QoS level for one or more users ("to ensure the required reception quality in the given environment, only time slots in subframes a, b and c as indicated in FIG. 3 would be used for transmission in each sector. The control limits the degree of concurrent transmissions, and thus the amount of interference, to achieve a target SIR for the desirable quality of service ("QoS")" (Col. 8, lines 60-65)).

As to claim 12, the Leung reference discloses the method of claim 1 in which temporarily reducing the transmissions comprises turning transmissions on and off in selected sectors according to the pattern ("it is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes

(labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 13, the Leung reference discloses the method of claim 12 in which the pattern includes turning off transmissions in other sectors more frequently to help users having lower communication rates ("TSRP divides the time frame (i.e., bandwidth) into a dedicated portion and a shared portion. At most one packet is transmitted among four neighboring cells during each time slot in the dedicated portion and up to three packets can be transmitted simultaneously in every cell in the shared portion. The purpose is to allow terminals at "good" and "poor" locations to use time slots in the dedicated and shared portion, respectively" (Col. 7, lines 35-42)).

As to claim 14, the Leung reference discloses the method of claim 1 also including arranging a frequency reuse factor of one or higher in the wireless system ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). As the applicant specification described that "Figure 1 shows frequency or time reuse factor of

three" for three-sectored cells (page 6, line 18), Figure 2 in Leung shows six-sectored cells and thus, a frequency reuse factor of six).

As to claim 16, the Leung reference discloses apparatus comprising

wireless transmission facilities ("sector antennas") for more than one sector of a cell ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56)), and

control facilities ("Base Stations") connected to the wireless transmission facilities and configured to determine a current state of transmission for one or more of the sectors serviced by the wireless transmission facilities, determine a transmission pattern for one or more of the sectors serviced by the wireless transmission facilities based on the determine current state of transmissions (the current state of transmission in the sectors of the cell is determined because a reuse pattern for the cell is specified (See FIG. 3)), and alter the SIR of at least one user in a sector of the cell by temporarily reducing transmissions on a forward link in at least one other sector of the cell or a sector in another cell in accordance with a pattern ("time is slotted such that a packet can be transmitted in each slot, and the downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically allocated to various transmitters to send data packets such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met for successful reception at the receiving

ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 17, the Leung reference discloses the apparatus of claim 16 in which the control facilities comprise sector controllers for controlling the wireless transmission facilities for the respective sectors ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). It is inherent that a Base Station comprises sector controllers to control the sector antennas).

As to claim 19, the Leung reference discloses apparatus comprising

a sector controller adapted to control transmissions in a sector of a cell of a wireless communication system and to communicate with other sector controllers in the cell or in one or

more other cells to coordinate the turning on and off of transmissions in at least one of the sectors based on the transmission state in at least another one of the sectors ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). It is inherent that a Base Station comprises sector controllers to control the sector antennas. "Time is slotted such that a packet can be transmitted in each slot, and the downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically allocated to various transmitters to send data packets such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus

will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claims 36 and 37, Leung discloses estimating a signal-to-interference-and-noise ratio based on information received from the mobile station; and determining an encoding and modulation scheme for the data packet based on the estimated signal-to-interference-and-noise ratio. Moreover, each sector transmits a pilot signal and the received information comprises information indicating a strength of the signals detected by the mobile station. See col. 2, lines 35-42.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,262,980 to Leung et al. in view of 3GPP2 C.P9010, CDMA 2000 High Rate Data Packet Interface Specification, Ballot Resolution Version, September 12, 2000.

As to claim 15, the Leung reference discloses the method of claim 1. It further discloses "the ESRA method could be used even for real-time traffic such as voice and video services" (Col. 15, lines 60-62) and "although a TDMA system was used to illustrate various embodiments of the invention, it can be appreciated that other systems fall within the scope of the invention" (Col. 16, lines 18-21). However, the Leung reference does not explicitly disclose the wireless

system comprises 1xEV-DO. The 3GPP2 C.P9010 reference teaches the wireless system comprises 1xEV-DO (see pages 1-1 to 1-11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Leung in which the wireless system comprises 1xEV-DO, as taught by 3GPP2 C.P9010, in order to support other new wireless systems.

Election/Restrictions

1. Newly submitted claims 20-35 and 38 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: these claims are directed to transmitting encoded data packets based on a reduction in transmission power during one or more time slots. Transmission power control techniques are classified in class 455, subclass 522, which was not required for the search of the original claims. Transmission power control techniques can be used for purposes other than those to which the present invention is directed, such as reaching a wider range of mobile stations from a single base station.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 20-35 and 38 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

2. Applicant's arguments filed 8/31/04 have been fully considered but they are not persuasive.

Applicant argues that Leung does not determine a current state of transmissions and a system based on a current transmission state in another one of the sectors of a cell. Examiner respectfully disagrees. Leung discloses a frequency reuse pattern and Examiner equates a reuse pattern with a "current state of transmissions." The claims do not distinguish the current state of transmissions from a reuse pattern. Moreover, since the reuse pattern applies to all the sectors of a cell, packet allocation is inherently based the current transmission state in any one of the sectors of the cell.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Bhattacharya whose telephone number is (703) 605-1171. The examiner can normally be reached on weekdays 8:30 a.m. to 6:00 p.m., first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester G. Kincaid can be reached on (703) 305-3016. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sb

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